The Baillairgé, Hurly Safety Raft.

The $20,000.00 Pollok prize competition of Sept. 9th. 1901 for the best life saving apparatus in case of disaster at sea

This competition was instituted for October at the Paris Exhibition of the year 1900, by Anthony Pollok, of the United States, who lost a relation by the wreck of the *Bourgogne* of the French line of ocean steamers.

The prize is offered for the solution of three problems, to wit :

1° To prevent collisions at sea

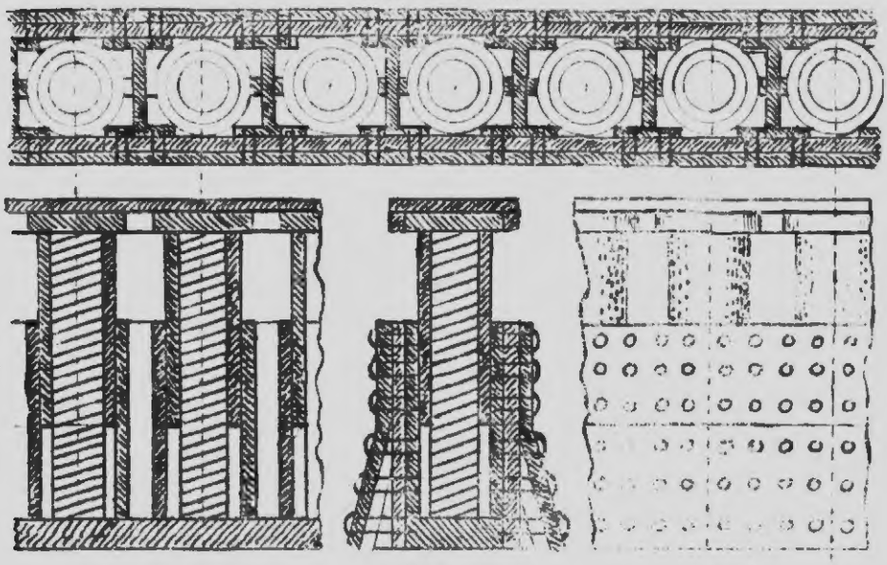
2° In case of collision, to save the vessel

3° If the vessel must go down, to save the passengers and crew.

Useless to say that the solution of case No 1 is almost hopeless or beyond human ken except it be by such a mutually repelling force between two vessels as might be brot about by magnetism, or by some system of pneumatic buffers as of the Westinghouse on railway trains, or of the more powerful action of a superposed series of hydraulic jacks all the way fore and in front or ahead of the stem of the vessel which might at least diminish the effect of the shock if not altogether neutralize it, and this I claim as a valuable suggestion and the only way in which the force of impact of one vessel against another can be reduced and rendered powerless, to wit : a series of as many springs of 9 to 10 inches in diam. as there are ft in the height of the stem of a colliding vessel, the springs enclosed in cylinders sliding into other cylinders confined between the outer side plates of the vessel's stem and separated say by inch thick steel partitions double flanged at each end and riveted to side plates of stem in a way to allow the stem to be as strong as if of a solid beam or port of steel or iron. These according as each spring where of a force of resistance of 20 to 30 tons more or less, their combined effect would be one, according to height of stem, of a thousand tons or more and thus capable of producing the desired result of nullifying the force of impact (see sketch thereof)

A SYSTEM OF STEEL SPRING BUFFERS IN STEM OF VESSEL
TO NEUTRALIZE COLLISIONS AT SEA

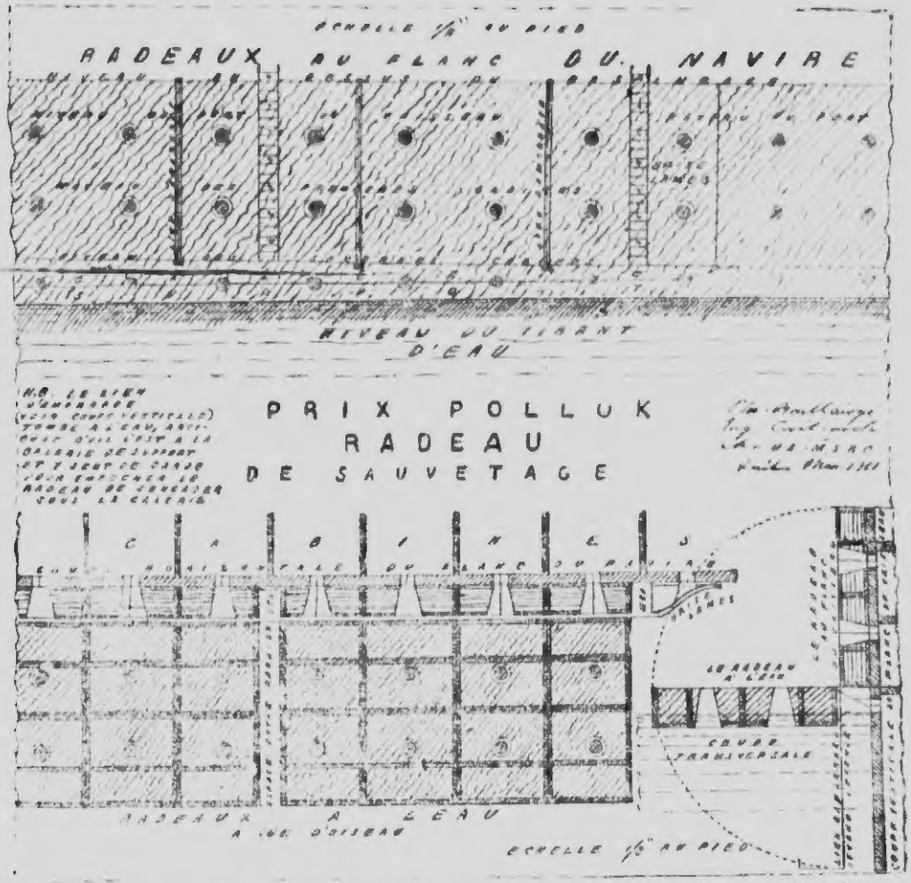
PART FRONT VIEW.



VERTICAL SECTION OF PART OF STEM OF VESSEL.

VERTICAL CROSS SECTION OF STEM OF VESSEL.

SIDE VIEW OF PART OF STEM OF VESSEL.



With regard to case No 2 M. Baillairge thinks he has already satisfactorily solved the problem as shown how it can be done some 3 years ago or in 1848 in his articles published in the "*Canadian Architect and Builder*" or in the "*Canadian Engineer*" and other papers of the period. This was after the foundering of the battle ship *Victoria* with over 400 souls on board when struck by the ram of the *Camperdown* during the great naval review of England on the occasion of the visit of the emperor William of Germany to that country some 4 or 5 years ago.

It will be remembered that the *Victoria* due to the weight of water accumulated on one and the same side of the vessel to which it was continued by the longitudinal bulk head caused the ship to keel over so that the vessels ports dipped below the sea when the water entered in increasing quantities causing the ship to roll over onto its beam ends and finally upset and go to the bottom.

The French liner *Bourgogne* went over with some 200 souls due to the same cause to wit its longitudinal bulk head causing the inflowing water to pile up on one side of the vessel thus causing it to lean and turn over.

This longitudinal bulk head is of course a most pertinent and necessary feature against mishap by protecting the fires from extinction on both sides of a vessel simultaneously and thus allowing it to proceed at half speed when the fires on one side have been put out by an inrush of water, but some mode should have been and can easily be devised, by a system of pipes and stop gates, to allow of the water getting access to the adjoining transverse compartments of the vessel fore or aft of the Engines and Boilers or both, and this is what M. Baillairgé has advocated, thus in reality solving problem No 2 by causing the vessel in the way proposed to maintain its centre of gravity, its upright position in the water, while of course settling down a little as due to the weight of water in the invaded compartments.

The solution may appear to be so simple as to be unworthy of any special recognition.

but if so, how is it then that no one has as yet sought to remedy the evil feature again repeated in the "*Bretagne*" so at least said the "*Scientific American*" in giving a description of the new vessel.

It is at Havre, France, on the 9th Sept next, as said before, that the adjudicating jury or Committee meet to examine exhibits and award the prize or pr[illegible] such portion of the prize as may be due to the relative importance of the case in hand, when M. Baillargé hopes to show by the vouchers submitted that he is entitled to something under this head.

Case No 3 is of course the most pertinent and important — "How to save the passengers and crew if the vessel must go down"

The exponents' first idea was for a deck raft, and fastened thereto by a simple interlocking device as of a bayonet to a musket, and which on an emergency could have been quickly loosened from its moorings and ready to float off the deck with its living cargo when the vessel were going down. More than one deck raft would of course be required for a large complement of crew and passengers, and the difficulty would be to find room for them all without interfering with the hatchways and manoeuvering of the vessel. Again it would be difficult to clear them all as quickly as should be, due to impediments of masts and shrouds, hatchways, deck lights, ventilators, chimneys and the like — but the greatest danger would be that of their being drawn or sucked down with the foundering vessel in the vortex which such a sinking of a vessel gives rise to and especially if, which so often happens, a vessel goes down front or aft foremost. The plans submitted however and specifications provide in as far as possible for and against all such eventualities; though on account of the risks, the exponents while leaving the value of the suggestion to the Committee to weigh and decide on, can not recommend this mode of providing for the safety or those on board.

What they do recommend as shown by the models submitted, is that the safety raft be applied outwardly, or to the sides or flanks of the vessel. M Hurly, the originator of this idea, submitted plans in October 1900 looking to this feature of the present exhibits, but having he says been pressed for time, could not elaborate his designs, nor submit models at the time, and the plans being crude and not properly and neatly made to scale, were therefore, he supposes, left unnoticed by the Jury.

M. Baillargé supposes however that the fact of no attention having been paid to M. Hurlys' first exhibits of Oct. 1900, is that he had in no way provided for the fact that his side raft, as then proposed, would shut out cabin lights, or windows, or dead eyes so called and this of course must have been considered fatal to his scheme; as no company would put up with or adopt a system, thus destroying light and ventilation to cabins etc., and leading to the necessity of artificial lighting during the whole of the 24 hours, and all for an eventuality which might possibly never materialize.

M. Baillargé is of opinion that this insuperable objection to M. Hurly's scheme as propounded in 1900, has been conjured by his (Mr Baillargés') proposal to build the rafts in a manner to interfere in no way with the light, ventilation of the cabins, saloons, dining rooms, passages or other appurtenances of the inner economy or features of the vessel. This he has done by piercing the life raft, with as many embrazured openings as there are of dead-eyes involved in the spaces to be covered by the rafts; and so as of course to be exactly opposite thereto.

At this juncture, the scheme, as matured and perfected by Mr. Baillargé and to which Mr. Hurly has necessarily given his adhesion, is that of a side raft to which there can as will be shown, be no possible objections. The raft is of course calculated to be bu[illegible]nt or insubmersible even with all on board; it being, within its steel or iron envelope or shell, made necessarily strong and stiff by timbering; while the required additional buoyancy is arrived at by a cork flooring properly secured, and by packing with cork or cork refuse the spaces or interstices between the timbered walls or partitions of the several compartments into which the raft is divided for purposes which will hereafter appear.

For vessels of heavy draught, or liners for both freight and passengers, where, when loaded, there may be but 15 ft. or thereabout, out of water, or from to 10 to 11 ft. exclusive of height of gunwale (gunnel) the safety raft or rafts, would be restricted to a width of some 12 ft. more or less, thus taking in a single tier of dead-eyes and clearing those below; while with vessels almost exclusively for passengers, the rafts would be made of a width of say 20 ft. or such as to include two tiers of cabin or other windows, while again clearing the third tier, counting downward, in a way not to interfere with their light, and at just such a height

above load water line as to allow of the raft being when launched at proper level ready to step into.

The raft as shown by the models and as seen also in plans and photos is supported on an iron gallery attached to the flank of the vessel and fastened thereto when not in use or actual service by the securers indicated and which any unskilled passenger or member of the crew can instantly detach to allow of pushing the raft over into the water.

It will be seen that the raft securing bars when detached fall over into the sea and that being hinged or articulated to outer edge of supporting gallery, they remain attached thereto and hang down vertically therefrom in a way to answer as fenders preventive of the possibility of the raft fouling by getting in any way jammed beneath the projecting gallery.

At the upper edge of raft a rope is tied, or two, one at each end thereof and fastened to a pin in the top or upper rail of the gunnel which when the raft is released and tumbled into the water is held on deck or tied to a hook in side of vessel to hold in the raft when launched and prevent it going adrift, and keep it along side landing gallery until all are on board.

When the raft is in the water, the passengers and crew get down onto the gallery that supported it, by a ladder as shown and from the gallery step into the raft, holding on the mean time, by a side rail fixed to vessel, till a lull in the waves allows of getting in without any danger of missing one's foot-hold.

The raft being 3½ feet high, all told with a thickness of 6 inches cork and flooring on bottom thus leaves a height of 3 feet of walls either to sit on or rest up against or to hold on by and prevent any danger in rough weather of being knocked down or upset.

The raft, as fully detailed in M. Hurly's last year's exhibit, is to have attached to it, in advance and permanently, to be ready at any time to send off, the necessary masts, spars, oars, etc. A so lockers for tools of all sorts, ropes, nails and spikes and one or more oil stoves, fishing and shooting apparatus to cover a delay of a week or more in being picked up by a passing vessel, or to allow of building sheds or shelters on any uninhabited or inhospitable shore to which the raft might drift or be taken.

M. Hurly has been thoughtful in the way of providing passengers who might miss the raft, or in a panic, jump into the sea, with a small grapnel and twine of sufficient strength by which they might catch the raft and pull themselves towards it to be taken aboard, or those in the raft might similarly be provided and throw out a buoyant hold-fast for the purpose. His, Hurley's scheme of Oct. 1900 also provided for each passenger a water tight self inflating buoyant dress and a paddle attached by which he could paddle himself to and the raft or ashore should he miss the raft.

All around the raft's upper edge when afloat will be found a series of auger holes about 8 inches deep in which to plant or set or introduce at distances say of 3 to 5 feet, as many iron eye-bars, or wooden ones with eyelets screwed into them through which to pass a rope all around the raft and to that attach a breadth of canvas say 3 to 3½ feet wide or high buttoned all around to the outer edge of raft as a carter buttons his rain curtains to his waggon, to protect all on board from wind and from the spray of the sea, stormy weather being more bearable when one is dry and clad to battle with it.

Two such rafts, of say 12 × 30 ft., one on each flank of vessel would be sufficient for a complement of say 200 passengers and crew — four of them or six for 400 to 600 — 10 of them for 1000 or 1200 souls — that is, as just stated, of the narrow or 12 ft. raft, for deeply laden vessels; while with vessels higher out of water the 20 ft. raft would be used, of which two — one on either side — would accommodate say 500 persons — four of them 1000, eight such rafts, 2000 souls and ten or twelve 3000 passengers and crew, five to six on each side of vessel.

These rafts, would of course only be adaptable to the plain faced or straight or parallel sides of any vessel and would never reach the fore and aft curved portions of the ship towards the bow and stern. This is evident, as for a 300 ft. ship for instance with 300 to 600 persons to care for, only two to 4 rafts would be required, which would therefore only extend 40 to 80 ft. along flank of vessel, whether steamer or sailer; while for a 500 to 700 ft. liner with from 2000 to 3000 on board, only from 160 to 240 ft. of the vessel would be covered by the rafts on each side; thus leaving from 160 to 240 ft. of the vessel clear at each end.

The rafts thus secured as already said to side of vessel would not unduly increase its breadth or by more that from 10, 14 per cent in a vessel 50 to 70 ft. wide, which would hardly be noticeable either as to weight of additional tonnage — (15 to 25 tons per raft all told of 12 to 20 ft. in breadth) an addition of 30 or 60 tons to a 1000 ton vessel or of 200 to 300 tons to a 10000 to 20000 ton ocean liner, and with no impediment to speed, the rafts being all above

the water line, the additional resistance to wind could only be an almost inappreciable trifle and at any rate a disadvantage not be weighed against the inappreciable boon of a certainty of absence of all danger for one's life.

Now as to the effect of waves impinging endwise on these projecting rafts which they of course would do during high seas, it will be seen as well by the photographic view as from the plans and models that this is provided for by fenders at each end so made of ogee form as to parry off the force of wave and cause it to expend itself along the upturned bottoms of the successive rafts, precisely as it would have done if the rafts were not there, against the flank of the vessel itself and without any tendency to move the rafts thus supported and thus solidly tied in situ and close alongside vessel, with ladders reaching down from gunnel to gallery. Our photo-gravure shows at top, an elevation plan or view of the raft as, when not in use, attached to flank of vessel. The lower diagram or figure is a birds-eye view of the raft when in the water; and the right hand figure, a cross section of flank of vessel and through raft as well when in place alongside as when in water in the act of loading; and in this figure can also be seen the pendant raft tie bars acting as fenders to prevent the raft from getting foul of projecting gallery.

Of the original prize of $20,000.00 there are now available but $18,000.00, the Jury of October 1900 having awarded $2,000.00 to M. Roper for an over-deck raft. This is merely an extension of the huricane or observation gallery on any vessel, reaching from flank to flank of vessel and made wider. This over-head deck raft is supposed to run off on rails and rollers until it falls into the sea. The jury awarded it something as being "something in the right direction", that is in its main feature of saving several hundred of the passengers and crew simultaneously; but the Jury pronounced it too big and unwieldy and at any rate it would seem difficult, if the raft as the Committee said, were made to hold only half the number of passengers, to see how space could be found on and over deck for enough such galleries or rafts, to ship and save a crew of from 2,000 to 3,000 souls—while the exponents' system is extensible at will, and even to 5,000 souls in a vessel like the *Celtic* without the 18 or 20 rafts required 9 to 10 on each side, reaching so far as to encroach on the curved ends of the vessel fore or aft. And again it must be improbable that, launched from such a height above water, M. Roper's raft can reach the water otherwise than at an angle approaching to a right angle and thus plunging beneath the surface, is sure to ship much water before righting itself for the reception of passengers; and all this water to be bailed out before passengers can outer raft, or wet every one's feet and legs and thus expose all to colds and coughs and sickness and thus hasten the death of many of those on board.

M. Baillairgé, though he has done all the work of the present exhibits, including plans models, specifications, correspondence, calculations of weights and cost and buoyancy, has nevertheless associated M. Hurly's name with it, because of this, M. Hurley's, originally conceived scheme of *side* instead of *deck* raft—though M Baillairgé must have likely arrived at the same disposal thereof, had he from the moment of the institution of the Pollok prize set his mind to work out the problem.

The jurors will please see, in experimenting with the models, that the bath or reservoir if too small or narrow which mine is, which accompanies the models, be well filled with water every time the raft is let fall into it; as otherwise, the wave of water displaced and driven away by the raft when launched, would cause a return wave or swell which would or might cause some water to enter the raft when it falls into the bath or cistern.

Mr. Baillairgé would suggest that the reservoir experimented with be so wide, alongside the model or vessel at to allow the wave or swell of water caused by the raft on falling into it, to spread out and go forward towards the open, as would be the case at sea.

The supporting gallery should and need not be more than from 3 to 4 ft. above sea level for the 20 ft. raft or 3 ft. for the 12 ft. raft above load line or draft of water; a height sufficient to be no obstruction to light of dead-eyes beneath the gallery; as, the nearer the gallery to the water, the easier and surer of launching the raft without any danger of its shipping water, and as its total draft when loaded will be put 2 to 2½ ft. or thereabout it will thus be at a convenient level to step into or out of.

Ocean navigation, swell and so called mountain waves are not unknown or unfamiliar to the writer who crossed the ocean in February 1874 in the S. S. *Circassian* of the Allan line in 14 days of stormy water, going by Portland and back in 10 days by the St. Lawrence route.